Name of the Researcher : **Mr. Dnyanoba Rambhau Awad**

Mobile Number : 7709178265

Email-id : dnyanobara@gmail.com

Category : NTC

Subject Name : Botany

Research Topic : "Studies on Neutraceutical Analysis of some Wild Tuberous Vegetables found in Marathwada"

Guide Name : Dr. Suresh. M. Telang

Mobile Number : 9822174684

Email-id : suresht78@gmail.com

Swami Ramanand Teerth Marathwada University, Nanded

A Synopsis on

The Proposed Research Work Leading to the Degree of

Doctor of Philosophy In

Botany

Entitled

"Studies on Neutraceutical Analysis of Some Wild Tuberous Vegetables found in Marathwada"

Submitted By

Mr. Dnyanoba Rambhau Awad

M. Sc. Botany, Maharashtra SET.

Under Supervision of

Dr. Suresh. M. Telang
M. Sc., Ph.D

Department of Botany and Horticulture,
Yeshwant Mahavidyalaya,
Nanded-431 606

September 2022

Introduction:

Vegetables that grow naturally without any cultivation or care are called wild vegetables. These plants mainly grow in forests, wilderness, edges of farmlands, and barren fields. In the early days of the monsoon season, these vegetables are available for consumption. Along with being vegetables, a majority of them are also medicinal plants. Most of the popular vegetables that we know of our recent introductions in our kitchens. Indians have been eating wild vegetables for thousands of years, but unfortunately, we lost the track somewhere at the dawn of modern times. Tribal and rural Indians still value these wild vegetables. An interesting fact is that some wild vegetables have a dedicated cult following in urban areas & big cities where they are sold in special markets.

In monsoon nature is offering us many leafy annuals which are part of our culture, traditions and festivals. This project is to create awareness about wild unconventional vegetables. Many of them are medicinally important and especially available during monsoon season. In Hindu culture Shravan month is celebrated as a holy month with many festivals. Usually non-vegetarians food is prohibited as during this season digestive power is comparatively weak and it's also coincide with the availability of such medicinal importance wild vegetables, therefore they must be utilized. So many literatures available on this vegetable like *Senna tora* is a plant species in the family Fabaceae and the subfamily Caesalpinioideae. Its name is derived from its Sinhala name tora. It grows wild in most of the tropics and is considered a weed in many places. Its native range is in Central America. According to Ayurveda the leaves and seeds of Takala acrid, laxative , antiperiodic, anthelmintic, ophthalmic, liver tonic, cardiotonic and expectorant. The leaves and seeds are useful in leprosy, ringworm, flatulence, colic, dyspepsia, constipation, cough, bronchitis, cardiac disorders.

Kurdu is a name of the *Celosia argentia* plant belongs to family Amaranthaceae. This plant is usually grown on marshy places and on non-usable lands as weed. The tender leaves are used as vegetable while leaves and seeds are of medicinal value. Other species of this plant are known as wool flowers or cockscombs.

Sonchus oleraceus is an annual and sometimes biennial herb, 40-150 cm tall, containing white latex in all plant parts (Nyárády, 1965; Anghel et al., 1972; Boulos, 1976; Hutchinson et al., 1984; Ciocârlan, 1990). *Sonchus oleraceus* commonly used as a fodder. It is also used to treat a wide variety of infections. *Sonchus oleraceus* used in the treatment of headaches, general pain, diarrhea, menstrual problems, fever, hepatitis, salmonella infection, wars, eye problems, liver infections, infections, inflammation and rheumatism. Stems and leaves are also used in cooking by local peoples. The latex in the sap is used in the treatment of warts. The leaves are applied as a poultice to inflammatory swellings.

Kartoli in the Marathi language is another name for Vandhyākarkoṭakī, a medicinal plant identified with *Momordica dioica* (spiny gourd) from the Cucurbitaceae or "gourd family" of flowering plants. (verse 3.61-63 of the 13th-century Raj Nighantu or Rājanighaṇṭu). There are are hundreds of more wild vegetables with different common names, cherished all over India by locals. All of these vegetables are cooked in desi style by using local spices and ingredients.

Human kind is experiencing very quick transformations in socio-economic expansion along with a rapid loss of biodiversity and emerging global health challenges. The recent 17 Sustainable Development Goals (SDGs) have been adopted by countries worldwide to target development challenges in terms of social, economic, and environmental issues that are plaguing both developed and developing countries worldwide, particularly in the agricultural sector. Being one of the top 10 megadiverse countries in the world, Malaysia has been experiencing a

steady decline in the loss of valuable flora and fauna diversity due to rapid modernization and urbanization. Out of the 15000 species of vegetable plants available, only 300 species indigenous to the country have been used as food.

Most of wild edible vegetable species have medicinal property and can be used to keep people healthy and fit. Further phytochemical and neutraceutical studies of these edible species may provide better nutritional source. Apart from the source for food, human also utilize plants for dyes, ornaments and medicines. Wild edible plants are source for nutrition but also posses higher medicinal property. These wild plants are grown in forest region without Chemical and Fertilizer. Most of wild vegetable are grown naturally without proper cultivation technique in forest area; specifically during monsoon season and collected by tribal people. Tribes are part of nature; they fulfill their need through wild resources. Their knowledge based upon traditional source. Consuming wild edible is food habits of people. Various reports also noted that many wild edibles are nutritionally rich and can supplement nutritional requirements, especially vitamins and micronutrient. Nutritional analysis of wild vegetable demonstrates that the nutritional quality of wild vegetable is comparable and in some cases they are superiors to domesticated verities. Many medicinal values of certain vegetables yet to be documented, so there so need have explored, analyze and document the wild vegetables which posses' medicinal values (Atrama Seema, 2015)

According to Burlingame (2000), there are at least one billion people who rely on wild edible plants for their sustenance. Wild edible plants are frequently found growing wild and free in marginal areas; therefore, they are regarded as a poor man's staple. However, they are crucial in local food and eating systems as they are an inherent part of local culture and are still used in traditional food preparations, and they are the focus of present food movements to restore culinary traditions.

Review of Literature and Development in the subject (Previous work done in the relevant area):

Khan Sheharyar et al. (2021) : The foraging and consumption of wild food plants is a long-standing tradition in many parts of the world and their importance in promoting food security has become more widely debated in recent years. The current study aimed to document, analyze, and interpret the traditional knowledge of non-cultivated vegetables among four Pathan tribe areas namely Alisher Khel, Hadarzai, Haji Khel, and Umarzai living in the Gadoon Valley, Swabi District, Khyber Pakhtunkhwa, NW Pakistan. They were were interviewed 104 informants via a semi-structured, open-ended questionnaire and group discussions.

Mersha Ashagre et.al (2016) have carried out ethnobotanical study of wild edible plants in Burji District, Segan Area Zone of Southern Nations, Nationalities and Peoples Region, Ethiopia. The objective of the study was to identify and document wild edible plants and the associated ethno botanical knowledge of the local people.

Vinayak Pai et al. (2019) have studied utility pattern of wild edible plants, factors affecting the population status of wild edible plants, preferred wild edible fruits for domestication and farmers preference for cultivation of wild edible fruit trees.

Nerea Turreira-García et al. (2015) Study of a pesar de ello, se sabe poco sobre los factores que determinan la distribución y transferencia del conocimiento de las WEPs a nivel global y se teme que su uso y conocimiento esté disminuyendo. Este estudio de caso tenía como objetivo examinar la distribución, transmisión y pérdida de conocimiento ecológico tradicional (TEK) relativa a las WEPs utilizadas por una comunidad maya de Guatemala y hacer el inventario de dichas plantas.

Besnik Rexhepi et al. (2018) An ethnobotanical study was conducted by them from March 2015 to November 2016 to investigate the traditional uses of wild edible plants in 23 villages of Pelagonia region (Southwestern Macedonia). Data for 94 species were collected through face-to-face interviewing and focus group discussion with 78 locally recognized knowledgeable elders over 60 ages of diverse ethnic groups (Macedonians and Albanians). Information about three main different methods of consumption (food, beverages and bread of yogurt starters) were recorded and compared.

Teklu (2019) Studied and found that the wild edible plants are important source of nutrient and vitamin supplements for indigenous people. Ethnobotanical study of the diversity and utility of wild edible plants.

Anbessa (2017) has studied wild edible plants. According to him wild plants are source of various micronutrients, vitamins, many alkaloids and carbohydrate etc,.

Ajaybanik et.al (2014) Studied natural forest is the source of supplies of various plants of tuberous and roots importance that provides carbohydrates and some minerals and are often important ingredients in traditional medicines. They used as drought and famine foods, not only because they survive in low rainfall periods, but can also be an important source of water. Looking to the importance of wild tuberous crop in the tribal dominating region of the State an ethno botanical study was conducted to document and compile the wild edible tubers that had been observed and investigated in Central part of Bastar region of Chhattisgarh State. So that their importance, traditional uses could be realized. And studied total of 22 wild edible tubers were identified and recorded as food sources during the study period were Amorphophallus paeoniifolius, Asparagus racemosus, Chlorophytum borivilianum, Colocasia esculenta,Costus speciosus, Curculigo orchioides, Curcuma amada, Curcuma angustifolia, Curcuma caesia, Dendrocalamus strictus,

Dioscorea alata, Dioscorea bulbifera, Dioscorea hispida, Dioscorea oppositifolia, Dioscorea pentaphylla, Dioscorea bulbifera var. pulchella, Hibiscus rugosus, Ipomoea batatas, Leea macrophylla, Pueraria tuberosa, Scirpus grossus, Urginea indica. Dioscorea or commonly known as yam was reported to be one of the major food sources in Bastar region.

Naik et al. (2017): Recommended as Wild edible plants play an important role in the livelihood of people residing in rural areas. Even today in most of the remote areas, people depend on plants which are available in their natural surroundings for food, medicine, shelter etc. Majority of wild edible vegetables have medicinal property and can be used to treat common ailments. About 52 different disease conditions like diabetes, rheumatism, dysentery, dyspepsia, gastritis, constipation, urinary disorders are frequently treated by these wild vegetables. These are easily available in natural habitat, cheap and excellent source of nutrients like proteins, carbohydrates, iron, essential minerals and other secondary metabolites. Regular use of these vegetables may indirectly act as an alternative source of medicinal drugs along with nutritional benefits.

Misra et al. (2012)10- studied the wild leafy vegetables are the major sources of vitamins and micronutrients for people using only vegetarian diets rich in carbohydrate .

Tardío et al. (2006) Studied the ethnobotanical data currently available on wild plants traditionally used for human consumption in Spain. Forty-six ethnobotanical and ethnographical sources from Spain were reviewed, together with some original unpublished field data from several Spanish provinces. A total of 419 plant species belonging to 67 families was recorded. A list of species, plant parts used, localization and method of consumption, and harvesting time is presented. Of the seven different food categories considered, green vegetables were the largest group, followed by plants used to prepare beverages, wild fruits,

and plants used for seasoning, sweets, preservatives, and other uses. Important species according to the number of reports include: Foeniculum vulgare, Rorippa nasturtiumaquaticum, Origanum vulgare, Rubus ulmifolius, Silene vulgaris, Asparagus acutifolius, and Scolymus hispanicus. We studied data on the botanical families to which the plants in the different categories belonged, overlapping between groups and distribution of uses of the different species. Many wild food plants have also been used for medicinal purposes and some are considered to be poisonous. This review highlights the rich traditional knowledge on edible plants that has remained in rural Spain.

Kuvar et al. (2019)Studied a Wild edible plants play a significant role in the sustenance of tribal people residing in forested areas. The study was to document the wild edible plants used by Kokni tribal of Nasik district of Maharashtra. The economically weaker section of the Kokni tribe is largely dependent upon the preparation from the wild plants. The tribal consumed tubers, leaves, flowers, fruits, seeds and grains of the wild plants. A total of 64 plant species belonging to 58 genera and 41 families were documented as wild plants used as food. The plant species, their families, local name, plant part used and their mode of usage were also reported.

Cheema et al. (2017) work is carried out by analyze the nutritional potential of 25 of the most commonly consumed wild and under- utilized fruits in the Terai region of Uttarakhand, India. The result of the different fruits analyzed revealed the richness of different phytochemicals among them. The protein content was found to be higher in *Solanum nigrum, Broussonetia papyrifera,* and *Aegle marmelos,* while *Terminalia bellerica, Ficus racemosa,* and *Artocarpus heterophyllus* were rich in lipid content. The reducing sugars ranged from 1.1–68.2% and non-reducing sugars varied from 0–6.4%. Vitamin analysis revealed higher ascorbic acid content in *Emblica officinalis* and *Pithecellobium dulce*, high

ribo- flavin content in *Broussonetia papyrifera* and *Ficus palmata*, and high thiamine content in Artocarpus lakoocha and *Solanum nigrum*. The phenolic content varied from 32.9–2662.4 mg/100 g, the flavonoids between 1.2–93.8 mg/100 g, and carotenoids ranged between 0–85.7 mg/100 g. These wild fruits proved to be a good source of nutrients.

Seema (2015) Suggested that the man has influence by wild edible plant from ancient time as they are valuable source of nutrition and healthy. By consuming ample amount of plants on a regular basis provide us considerable amount of protein, lipids, carbohydrate and other essential components for the body function, proper supplementation of all necessary vitamins, minerals and other compounds is require for the better health and due to their medicinal property we can develop a new drug in future. Thus indirectly they act as alternative source of medicinal drug and easily available in natural habitat.

Morales1 et al. (2020) Studied that the traditional use of non-cultivated vegetables has decreased with the development of agriculture and global supply chains. However, some species are still consumed as part of our traditional Mediterranean diet. Plants are among the most important sources of natural antioxidants for retarding lipid oxidative rancidity in foods or for pharmaceutical applications against chronic diseases related to free radicals production.

Sa´nchez-Mata (2011) have studied the chemical composition of different wild and under-utilized vegetables of the Mediterranean area, concerning their organic acid profile and the distribution of ascorbic and dehydro- ascorbic acids as vitamin C activity. Fifteen species, belonging to ten botanical families, were selected, analyzing two samples of each one from two different localities of Central Spain.

Beldar et al. (2020) They studied in Maharashtra, around 417 plant species belonging to 101 families have been used for primary healthcare. Plants from families like Acanthaceae, Asteraceae, Caesalpiniaceae,Cucurbitaceae, Euphorbiaceae, Fabaceae, Lamiaceae, Liliaceae, Malvaceae, and Poaceae were most frequently utilized in Maharashtra. The people of Maharashtra use these medicinal plants as a single dose or in combination with others.

Material and Methods:

Plant Material Collection

Identification of Plants by using taxonomic keys.

Preparation of plant extract by using Soxhlet method of selected plants.

Determine the presence of different phytoconstituentes

Determine the Neutraceutical value of selected plants

Determine the antibacterial and antifungal activity of selected plants.

Importance of proposed study

The nutritional composition of wild fruits and vegetables from this region reveal a positive possible contribution to the diet. Although fruits and vegetables play a positive role in the provision of a healthy and balanced diet, these cannot replace foods from other food groups such as meats and starchystaples. Their consumption is therefore necessary especially in the provision of some phytochemicals especially antioxidants, necessary for the proper functioning of the immune system.

The popularity of A. di- gitata and Z. mauritiana fruits as well as A. spinosus, B. pilosa, C. gy- nandra, C. olitorius, S. nigrum and V. amygdalina leafy vegetables in the majority of t for further domestication studies based on acceptability and popularity of these species throughout the region. The nutraceutical values of these wild food plants put them at an advantage over some domesticated, exotic and popular species. The antioxidant activities of these wild food plants further add value to their ability to provide a healthy and balanced diet. The world, including sub-Saharan Africa is endowed with a variety of wild food plants which can be exploited independently throughout the year, however, the major challenges to their inclusion in the diet remain acceptability and accessibility and general lack of interest and neglect. These challenges can be overcome by educating people on

their benefits through various sources of media with a goal to create an interest in them and eventual inclusion in the diet and consumption. Domestication can help with accessibility issues especially for those species that are popular but difficult to access. However, poor mar- keting, lack of government support, lack of value addition and inability to meet market demand and standards remain major challenges facing the cultivation of these minor species. Seeds need to be produced and made easily accessible to the farmers, marketing strategies put into place and value added to the final products, especially fruits so that they become more attractive to the consumers.

A large section of the tribal communities is practicing agriculture due to an ethnical shift in their culture. However, the wild fruits are still a regular constituent in their diet. The life of tribal people is very much depends upon the plant products because mainly they use the plant as vegetables and few species were used as fruits. They are very simple people and the knowledge of them is very interesting.

Objective of Research/ Proposed Hypothesis:

1. To select and collect the wild vegetables.
2. To examine the selected plants.
3. To prepare herbarium/digitization of selected plants.
4. To detect the chemical constitute and nutrients profiling of selected plants.
5. To study the active principles
6. To study the medicinal properties of wild vegetables.

Proposed Work plan:

Sr. No.	Year	Activity	Tentative Duration
1	**I Year**	1. Selection and collection of wild vegetables. 2. Herbarium preparation/Digitization **3.** The Botanical examination of selected plants	12 Months
2	**II Year**	1. Preparation of plant extract by using Soxhlet method of selected plants. 2. Chemical constitute of selected plants. 3. Study of medicinal properties of wild vegetables	12 Months
3	**III Year**	1. Study of nutritional value. 2. Antifungal, antibacterial activity of selected plants 3. Completion of Result	12 Months

Referances:

1. Sheharyar Khan 1 , Wahid Hussain 2,* , Sulaiman 1 , Sikandar Shah 1 , Hidayat Hussain 3 , Ahmed E. Altyar 4 , Mohamed L. Ashour 5,6 and Andrea Pieroni 7,8 (2021): Overcoming Tribal Boundaries: The Biocultural Heritage of Foraging and Cooking Wild Vegetables among Four Pathan Groups in the Gadoon Valley, NW Pakistan.

2. Mersha Ashagre1*, Zemede Asfaw2 and Ensermu Kelbessa(2016) 2: Ethnobotanical study of wild edible plants in Burji District, Segan Area Zone of Southern Nations, Nationalities and Peoples Region (SNNPR), Ethiopia .

3. Vinayak Pai* , B.N. Satish, T.S. Hareesh, C.G. Kushalappa and B.G. Nayak (2019)3: Ethnobotanical Survey of Wild Edible Plants in Different Landscapes of Kodagu.

4. Nerea Turreira-García1*, Ida Theilade1 , Henrik Meilby1 and Marten Sørensen2 (2015)4 :Wild edible plant knowledge, distribution and transmission: a case study of the Achí Mayans of Guatemala .

5. 1Besnik Rexhepi, 2Ani Bajrami, 3Behxhet Mustafa (2018)5: Ethnobotanical Study of Wild Edible Plants In Pelagonia Region (Southwestern Macedonia)

6. Yohannis Teklu (2019)6: Ethnobotanical Study on the Diversity and Utilization of Wild Edible Plants in Majang Zone of Gambella Region, Southwest Ethiopia.

7. Baressa Anbessa (2017)7: Ethnobotanical Study of Wild Edible Plants in Bule Hora Woreda, Southern Ethiopia

8. Ajaybanik, Sharad Nemaand Deo Shankar (2014)8: Wild edible tuber and root plants available in bastar region of Chhattisgarh.

9. Raghavendra Naik,1 Sneha D. Borkar,2 Sulochana Bhat,3 Rabinarayan Acharya4(2017)9: Therapeutic potential of wild edible vegetables.

10. Shalini Misra1, RK Maikhuri*1, CP Kala2, KS Rao3 and KG Saxena (2012)10: Wild leafy vegetables: A study of their subsistence dietetic support to the inhabitants of Nanda Devi Biosphere Reserve, India

11. Javier Tardío1 *, Manuel Pardo-De-Santayana2† And Ramón Morales2 (2006)11: Ethnobotanical review of wild edible plants in Spain.

12. Sachin D Kuvar1 And R D Shinde2 (2019): Wild Edible Plants Used By Kokni Tribe Of Nasik District, Maharashtra

13. Jagbeer Cheema, Kuldeep Yadav, Navnita Sharma, Ishan Saini, and Ashok Aggarwal: Nutritional Quality Characteristics of Different Wild and Underutilized Fruits of Terai Region, Uttarakhand (India) (2017)

14. Atram Seema: Medicinal Properties of Wild Leafy Vegetables Available In Maharashtra State In Rainy Season.

15. Rachel Thomas Tharmabalan: Nutritional Analysis of Five Wild Edible Vegetables Traditionally Consumed by the Orang Asli in Perak (2021).

16. Patricia Morales1,2, Ana Maria Carvalho1, Mª Cortes Sánchez-Mata3, Montaña Cámara3, María Molina4, Isabel C.F.R. Ferreira1: Tocopherol Composition And Antioxidant Activity Of Spanish Wild Vegetables (2020)

17. M. C. Sa´nchez-Mata, R. D. Cabrera Loera P. Morales, V. Ferna´ndez-Ruiz M. Ca´mara , C. Dı´ez Marque´s , M. Pardo-de-Santayana , J. Tardı´o:Wild vegetables of the Mediterranean area as valuable sources of bioactive compounds (2011)

18. Vishal G Beldar*, Parin S Sidat: Ethnomedicinal Plants used in Maharashtra for Treatment ofVarious Diseases and Disorders (2020)

19. Burlinggame: wild nutrition Jouranl of food composition and analysis, vol.13, no.2, pp99-100, 2000.

Dnyanoba R. Awad
Research Scholar

Dr. Suresh M. Telang
Research Guide